#679

PIONEER-VENUS

EDR DATA

78-051A-07B

PIONEER VENUS

ORBITER RETARDING POTENTIAL ANALYZER

EDR DATA

78-051A-07B

This data set catalog consists of 1 data tape. The tape is 9 track, 6250 BPI, multi-filed created on a VAX computer, using the COPY utility. The data were originally received on 4 magnetic tapes. These were then stacked onto 1 tape. The D and C numbers along with the timespan are as follows:

D#	C#	FILES	TIME SPAN
D-79866	C-27364	1349	12/05/78 - 08/14/86

PIONEER VENUS

ORBITER RETARDING POTENTIAL ANALYZER

NSSDC SUBMISSION DOCUMENTATION

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Introduction

This document describes the Pioneer Venus (PV) Retarding Potential Analyzer (RPA) National Space Science Data Center (NSSDC) low frequency data (LFD) experimenter data record (EDR) tapes. These tapes contain one file for each orbit for which data are available. Each file consists of three information records followed by n data records. The value of n is variable for each orbit (file), but does not exceed 721. Each data record consists of four quantities associated with a time tag followed by 25 phyical quantities unique to the RPA. The formats for the three information records and the data records are described in the attached report "INSTRUCTIONS FOR DATA SUBMISSIONS TO THE NATIONAL SPACE SCIENCE DATA CENTER, A COMMITTEE REPORT" by Roger A. Craig and dated August 11, 1983. Ephemeris data for the time tags in each record is contained on a supplementary experimenter data record (SEDR) tape supplied to NSSDC by the Pioneer Venus Project Office and will not be described in this document.

The PV RPA is described in considerable detail by Knudsen et al. [1979,1980]. The principles of measurement are also described therein together with some of the factors affecting the accuracy of the derived quantities. Additional information on the theory of measurement by an RPA is presented by Knudsen [1966].

We describe in this documentation the list of 25 quantities provided in the RPA EDR tapes and their limitations appropriate to the submission beginning Oct 4, 1988. We expect to improve the algorithms used to reduce RPA data as time permits, and future subissions are expected to be more complete and error free. This documentation will be updated from time to time to reflect changes in the submitted data.

The PV NSSDC LFD SEDR tapes have time tags at 12 second intervals from 30 minutes prior to periapsis to 30 minutes after periapsis. These time tags are the tags specified in the first four quantities of each of the EDR data records. All PV instruments are to report their data at these common time tags for the purpose of easy intercomparison of data. Principal Investigators (PIs) with instruments with a sampling period much less that 12 seconds are to report the average of measured quantities over a 12 second interval centered on the time tags. The RPA, because of a low telemetry word assignment, records at most one current-voltage (I-V) characteristic curve per spacecraft spin period. Except for one set of 14 orbits, the spin period of the PV spacecraft has been about 12 seconds. Thus, RPA physical quantities are derived at intervals of 12 seconds or more. Since the RPA operates in several modes, a particular quantity such as thermal electron temperature may be typically measured at much longer intervals. The thermal electron temperature is typically measured at either approximately 48 or 60 second intervals. In a few orbits, it was measured at 12 second intervals.

Since the RPA measures its quantities at time intervals of 12 seconds or greater, averaging RPA quantities is meaningless. Consequently, RPA quantities are reported in the EDR data records as derived. The derived value is, for the most part, reported in that data record whose time tag is within plus or minus 6 second of the actual time of measurement. (An individual RPA I-V curve is measured in a time interval of approximately 0.2 seconds. The average time interval between measurement of successive I-V curves is approximately 12 seconds.) The actual time at which the quantity was recorded is given in the record immediately following the four quantities specifying the time tag. Thus, an investigator can use his own scheme of averaging to assign a value to time tags or may plot or otherwise use the quantites at their times of actual recording. When no RPA quantity is available for recording at a specified time tag, no data record for that time tag is written on the NSSDC EDR tape.

RPA quantities may be unavailable for assigning to a specific time tag for several reasons as follows: The spacecraft data format in use at the time may not have contained any words for the RPA. The RPA may have been turned off for power conservation reasons. The spacecraft telementry bit rate and/or data format may have been such that an RPA I-V curve was recored only at long time intervals. RPA data for an interval of time, including the time tag, has not been reduced. (RPA data at the time of this submission have been reduced for only a small time interval about periapsis: plus and minus approximately 15 minutes for the first 800 orbits, plus and minus approximately 30 minutes for orbits 800-1300, plus and minus 60 minutes for orbits 1300-2890.)

RPA Measured Quantities

The PV RPA is described together with some of the principles of measurement in some detail by Knudsen et al. [1979,1980]. Many of the factors affecting accuracy are also described therein. We present in this section the quantities recorded on the NSSDC EDR data files following the four time tag quantities, their nominal uncertainty and measurement noise level, and additional limitations of the quantities.

Table 1 lists the symbol, quantity, measurement range with units in which the quantities are quoted, noise level of measurement, and uncertainty of the measurement for the quantities reported by the RPA. We have included in the list of quantities the vector components of the ion bulk velocity even though we do not supply values in this Oct 1988 submission to NSSDC.

UT: UT is the universal time in milliseconds assigned to the physical quantities recorded in this record. UT will typically, but not always, lie within plus or minus 6 seconds of the time of day assigned to the time tag of this record. UT should be accurate to within plus or minus 0.1 second.

TOTI: TOTI is the total ion density of the plasma in cm-3 and is derived from the FORTRAN expression

TOTI=F1I/(VN*e*Area)

where F1I is the first ion current measured with zero retarding potential, VN is the component of ion bulk velocity parallel to the RPA axis derived from the 1st-squares analysis when an analysis was possible, e is the electronic charge, and AREA is the effective area of the RPA collector (= 0.81 cm2). When a 1st-squares analysis is not possible, VN is the component of the spacecraft velocity in ecliptic coordinates parallel to the RPA axis.

H+: H+ is the hydrogen ion density. When the RPA is operating in one of its peaks mode, H+ will be detected and recorded only when its density is greater than approximately 10% of the sum of more massive ion densities. H+ can be the second most abundant ion and still not be recorded when the RPA is operating in its two peaks mode. The uncertainty of the H+ density also depends on its density relative to that of more massive ions. For an H+ density comparable to that of more massive ions, the accuracy should be of the order of 10%. The detection noise level for H+ is estimated at 300 cm-3. Additional discussion of the RPA ion peak detection capability and limitaion is given by Miller et al. [1984].

O+: O+ is the oxygen ion density. It will be detected in the presence of more massive ions only when its density is greater than approximately 10% of the sum of more massive ions. The RPA does not resolve C+, N+, or O+. We have assumed in our least-squares fitting that ([C+] + [N+])/[O+] is constant at 0.07, a value derived from PV ion mass spectrometer results.

M29+: M29+ is the symbol assigned to the sum density of ions with mass near 32 atomic mass units, CO+, NO+, N2+, O2+. The RPA does not resolve these masses. In performing a least squares analysis, I have permitted the algorithm to adjust the density of a mass 32 ion and a fictitious mass 29 ion in fitting the measured DI peak corresponding to this mass range [Miller et al., 1984]. Measurements by the PV IMS have revealed that the density of NO+ can approach the density of O2+ in some regions of the Venus ionosphere. My experience has been that although the median density of each of the two masses varies with altitude in the expected way, on successive sweeps the least squares analysis can assign all the density to mass 29 for one sweep and to mass 32 in the next. For the NSSDC files, I have added the densities of the mass 29 and 32 ions and entered them under the symbol M29+. RPA results as well as IMS results show that the predominant ion mass in the group is 32 in most regions regions of the ionosphere. In future submissions, the sum density of this mass group will be submitted under the symbol m32+.

CO2+: CO2+ is the density of the carbon dioxide ion.

TI: TI is the ion temperature and is assumed to be the same for all ion masses. It is one of the ajustable variables in the least-squares analysis of ion sweeps.

VX: VX is the x component of ion bulk velocity. The vector ion bulk velocity is derived from three component velocities parallel to the RPA axis measured in three succesive spin periods of the PV spacecraft [Knudsen et al., 1980]. In deriving the vector, it is necessary to assume that the ion bulk velocity is uniform over the region of space traversed by the spacecraft in two spin revolutions of the spacecraft, a distance of about 250 km. The coordinate system in which VX, VY, and VZ are given will be specified when data are submitted.

VY: VY is the y component of the bulk ion velociy.

VZ: VZ is the Z component of the ion bulk velocity.

F1I: F1I is the saturation (first) current measured in an ion I-V sweep. The retarding potential is programmed to be slightly negative of plasma potential during this measurement. F1I is measured relative to the ion current measured with the retarding potential equal to 37V positive [Knudsen et al., 1979].

BKGI: BKGI is the current to the RPA collector measured just before the beginning of an ion sweep with the retarding potential set at approximately +37V relative to plasma potential.

VPI: VPI is the value of the spacecraft potential relative to plasma potential that is assumed to exist at the time of the ion sweep. The value is derived by interpolating between values of the spacecraft potential measured in the thermal electron mode.

TOTE: TOTE is the total electron density derived from the thermal electron mode saturation current F1E. The formula used for this present NSSDC submission, in FORTRAN language, is:

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TOTE = 6.15E9*MAX(0, -3.5E-9 -F1E)**0.847
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We consider this measure of the total electron density to be approximate and valid only while the PV spacecraft is within the ionosphere.

TE: TE is the thermal electron temperature derived using equation (1) in Knudsen et al. [1980]. When the spacecraft is positive relative to plasma potential, a condition existing with the spacecraft in the sun and in a low density plasma, the value of TE is representive of the secondary electrons trapped in the positive spacecraft potential well.

F1E: F1E is the saturation electron current measured at the beginning of a thermal electron mode sweep. The front (retarding) grids are at a potential of +6.8 V relative to the spacecraft ground.

BKGE: BKGE is the current measured by the RPA electrometer at the beginning of the thermal electron mode. The front (retarding) grids of the RPA are held at a potential of -4.6 V during the measurement.

VPTE: VPTE is the spacecraft potential relative to the ambient plasma potential. It is derived from the thermal electron sweep data as described BY Knudsen et al. [1980]. When the spacecraft is in the solar wind and exposed to the sun, its potential is typically a few volts positive with respect to the solar wind plasma potential. VPTE loses its meaning in this situation.

N1: N1 is the density of the low temperature Maxwellian electron distibution used to fit the suprathermal electron I-V curve [Knudsen et al., 1985].

T1: T1 is the temperature of the low temperature Maxwellian electron distribution.

N2: N2 is the density of the high temperature Maxwellian electron distribution used to fit the suprathermal electron I-V curve [Knudsen et al., 1985]

T2: T2 is the temperature of the high temperature Maxwellian elctron distribution.

F1P F1P is the electron current measured by the RPA with zero retarding potential on the retarding grid.

BKGP: BKGP is the electron current to the RPA with the retarding potential on the retarding grid equal to -58V.

VPPE: VPPE is the spacecraft potential relative to the ambient plasma potential. When the spacecraft is in the solar wind and not in the Venus umbra, the spacecraft is positive, and the potential is inferred from the suprathermal electron I-V curve. When the spacecraft is within the ionosphere or in the Venus umbra, the potential is either estimated or taken from the potential measured in the thermal electron mode.

The quantities TOTI, H+, O+, M29+, CO2+, TI, VX, VY, VZ, N1, T1, N2, and T2 are derived by least-squares fitting a strongly non-linear numerical algorithm to an I-V curve. It is necessary in performing such a fit to supply an initial estimate of the quantities that are to be derived. If the estimates are not sufficiently close to the true least-squares values, the algorithm may yield a grossly erroneous value by converging to a relative minimum of the variance and not to the absolute minimum. Also, it may not converge at all. Although some such erroneous values have been eliminated from our basic tables tapes by checking for the magnitude of the variance, some erroneous values are known to be present. Such values can be way outside the nominal uncertainty quoted in Table 1.

The algorithm that scans the data in an ion I-V curve and computes the initial estimates of the ion quantities must also make a decision as to what ion mass is represented by a peak in DI [Knudsen et al., 1979; 1980]. The voltage at which the DI peak occurs for a given mass may be substantially smaller or larger than the nominal value because the Venus ionosphere is moving relative the planet with a velocity that can approach that of the spacecraft. Consequently, some peaks in DI have been assigned the wrong mass. The result is not only an erroneous concentration for that mass but also an erroneous ion velocity and total ion density. It is possible to recognize the incorrect assignments when comparing several I-V curves which are adjacent to each other in time, but the analysis algorithms are not this sophisticated. A few errors in ion quantities are present in the NSSDC files resulting from this difficulty.

The analysis of a suprathermal electron I-V curve is similarly difficult. The interpretation of the electron distributions contributing to the I-V curve depends on the potential of the spacecraft relative to the ambient plasma which, in turn, depends on the location of the spacecraft and the properties of the ambient plasma. The spacecraft is negative in the dense ionospheric plasma. It is positive in the low density solar wind plasma provided the spacecraft is not in the umbra of the planet. An additional complication arrises in that the sign of the current to the electrometer occasionaly changes from negative to positive during a sweep. This can occur because the background current, with maximum retarding potential applied to the retarding grids, is compensated close to the noise level of the electrometer just before the sweep begins [Knudsen et al., 1979]. If the background current that has been compensated is significant relative to the saturation current and changes in the right direction during the ensuing sweep, the total current will go through zero and the sign change. The background current can change because the orientation of the rotating spacecraft relative to the sun changes, because a purly temporal change occurs or because the location of the spacecraft changes. Switching of the current from one sign to the other with the electrometer in its most sensitive mode produces a noise spike in the electrometer that is digitized and becomes part of the I-V curve. Writing an algorithm that recognizes the noise spike and the change in current sign is difficult because the sign of only the saturation current and background current of a sweep has been retained in the I-V data for reasons of minimizing the telemetry requirements of the RPA. A trained observer, looking at an I-V plot, can rather quickly recognize in most cases when this condition has occured, but it is difficult to write an algorithm that can recognize all the possible situations and make the necessary adjustments.

In summary, some of the quantities contained in this submittal of RPA data to the NSSDC are erroneous because of bad least-squares fits to the I-V curves. These bad fits have not been detected by our current algorithms for reduction of the data and have not been removed by a trained observer viewing the I-V curves and making an educated judgement.

References

Knudsen, W. C. Evaluation and demonstration of the use of retarding potential analyzers for measuring several ionopheric quantities, J. Geophys. Res., 71, 4669-4678, 1966.

Knudsen, W. C., J. C. Bakke, K. Spenner, and V. Novak, Retarding potential analyzer for the Pioneer-Venus Orbiter mission, Space Sci. Instrum., 4, 351-372, 1979.

Knudsen, W. C., K. Spenner, J. Bakke, and V. Novak, Pioneer Venus orbiter retarding potential analyzer experiment, IEEE Trans. Geosci. and Remote Sensing, GE-18, 1, 54-59, 1980.

Knudsen, W. C. and K. L. Miller, Pioneer Venus suprathermal electron flux measurements in the Venus Umbra, J. Geophys. Res., 90, 2695-2702, 1985.

TABLE 1

SYMBOL	QUANTITY	RANGE	NOISE LEVEL	UNCERTAINTY
UT	UNIVERSAL TIME OF MEASUREMENT	$0 - 8.7\times10^{7}$ ms	-	0.1 s
TOTI	TOTAL ION DENSITY	$10 - 1\times10^{7}$ cm^{-3}	10 cm^{-3}	10%
H^{+}	HYDROGEN ION DENSITY	$300 - 10^{7}$ cm^{-3}	300 cm^{-3}	10%
O^{+}	OXYGEN ION DENSITY	$300 - 10^{7}$ cm^{-3}	300 cm^{-3}	10%
$M29^{+}$	SUM DENSITY OF CO^{+}, N_2^{+}, NO^{+}, O_2^{+}	$300 - 10^{7}$ cm^{-3}	300 cm^{-3}	10%
CO_2^{+}	CARBON DIOXIDE ION	$300 - 10^{7}$ cm^{-3}	300 cm^{-3}	10%
TI	ION TEMPERATURE	150 - 10,000 K	-	10%
VX	ION BULK VELOCITY, X COMPONENT	0 - 7 km/s	0.4 km/s	0.4 km/s
VY	ION BULK VELOCITY, Y COMPONENT	0 - 7 km/s	0.4 km/s	0.4 km/s
VZ	ION BULK VELOCITY, Z COMPONENT	0 - 7 km/s	0.4 km/s	0.4 km/s
F1I	SATUATION ION CURRENT	$0 - 1.3\times10^{-4}$A	1×10^{-12}A	1%
BKGI	ION BACKGROUND CURRENT	$0 - 1.3\times10^{-4}$A	1×10^{-12}A	1%
VPI	SPACECRAFT GROUND POTENTIAL	-5 - +3 V	-	0.1V
TOTE	ELECTRON DENSITY	$10^{2} - 10^{7}$ cm^{-3}	-	-
TE	ELECTRON TEMPERATURE	300 - 20,000 K	-	10%
F1E	SATURATION ELECTRON CURRENT	$0 - 1.3\times10^{-4}$A	1×10^{-12}A	1%
BKGE	ELECTRON BACKGROUND CURRENT	$0 - 1.3\times10^{-4}$A	1×10^{-12}A	1%
VPTE	SPACECRAFT GROUND POTENTIAL	-5 - +3V	-	0.1V
N1	FIRST SUPRATHERMAL ELECTRON DENSITY	$0 - 10^{7}$ cm^{-3}	1 cm^{-3}	20%
T1	FIRST SUPRTHERMAL ELECTRON TEMPERATURE	0 - 100 eV	0.2 eV	20%
N2	SECOND SUPRATHERMAL ELECTRON DENSITY	$0 - 10^{5}$ cm^{-3}	1 cm^{-3}	20%
T2	SECOND SUPRATHERMAL ELECTRON TEMPERATURE	0 - 100 eV	0.2 eV	20%
F1P	SATURATION SUPRATHERMAL ELECTRON CURRENT	$0 - 1.3\times10^{-4}$A	1×10^{-12}A	1%
BKGP	BACKGROUND SUPRATHERMAL ELECTRON CURRENT	$0 - 1.3\times10^{-4}$A	1×10^{-12}A	1%
VPPE	SUPRATHERMAL ELECTRON SPACECRAFT POTENTIAL	0 - +20V	-	0.1 - 5V

ASC II List of Pioneer Venus
12/5/78 – 8/14/86
1349 files

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  T1    N2    T2  F1P BKGP VPPE
(I8,I9,I5,I6,I9,0PF7.0,3F4.1,1P2E9.2,0PF6.2,2F7.0,1P2E9.2,0PF6.2,F7.0,F4.2,2F5.1,1P2E9.2,0PF6.2)

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19780339 53194817     1 -1488999999999999999.999999.999999.999999.999999.999999.99.999.999.9 9.99E+0
0 9.99E+00999.99999999.999999. 9.99E+00 9.99E+00 99.99999999.9.99999.9999.9 9.99E+00 9.99E+00999.99
19780339 53206817     1 -1476999999999999999.999999.999999.999999.999999.999999.99.999.999.9 9.99E+0
0 9.99E+00999.99999999.999999. 9.99E+00 9.99E+00 99.99999999.9.99999.9999.9 9.99E+00 9.99E+00999.99
19780339 53218817     1 -1464999999999999999.999999.999999.999999.999999.999999.99.999.999.9 9.99E+0
0 9.99E+00999.99999999.999999. 9.99E+00 9.99E+00 99.99999999.9.99999.9999.9 9.99E+00 9.99E+00999.99
19780339 53230817     1 -1452999999999999999.999999.999999.999999.999999.999999.99.999.999.9 9.99E+0
0 9.99E+00999.99999999.999999. 9.99E+00 9.99E+00 99.99999999.9.99999.9999.9 9.99E+00 9.99E+00999.99
19780339 53242817     1 -1440999999999999999.999999.999999.999999.999999.999999.99.999.999.9 9.99E+0
0 9.99E+00999.99999999.999999. 9.99E+00 9.99E+00 99.99999999.9.99999.9999.9 9.99E+00 9.99E+00999.99
19780339 53254817     1 -1428999999999999999.999999.999999.999999.999999.999999.99.999.999.9 9.99E+0
0 9.99E+00999.99999999.999999. 9.99E+00 9.99E+00 99.99999999.9.99999.9999.9 9.99E+00 9.99E+00999.99
19780339 53266817     1 -1416999999999999999.999999.999999.999999.999999.999999.99.999.999.9 9.99E+0
0 9.99E+00999.99999999.999999. 9.99E+00 9.99E+00 99.99999999.9.99999.9999.9 9.99E+00 9.99E+00999.99
19780339 53278817     1 -1404999999999999999.999999.999999.999999.999999.999999.99.999.999.9 9.99E+0
0 9.99E+00999.99999999.999999. 9.99E+00 9.99E+00 99.99999999.9.99999.9999.9 9.99E+00 9.99E+00999.99
19780339 53290817     1 -1392999999999999999.999999.999999.999999.999999.999999.99.999.999.9 9.99E+0
0 9.99E+00999.99999999.999999. 9.99E+00 9.99E+00 99.99999999.9.99999.9999.9 9.99E+00 9.99E+00999.99
19780339 53302817     1 -1380999999999999999.999999.999999.999999.999999.999999.99.999.999.9 9.99E+0
0 9.99E+00999.99999999.999999. 9.99E+00 9.99E+00 99.99999999.9.99999.9999.9 9.99E+00 9.99E+00999.99
19780339 53314817     1 -1368999999999999999.999999.999999.999999.999999.999999.99.999.999.9 9.99E+0
0 9.99E+00999.99999999.999999. 9.99E+00 9.99E+00 99.99999999.9.99999.9999.9 9.99E+00 9.99E+00999.99

***** JCB DONE.
$EXE TPLIST ES

INPUT PARAMETERS ARE:  AS SR=1=1 1 1 358

 TAPE NO.                FILE NO.   358
 RECORD   1              LENGTH   792
025   UT TOTI   H+   O+ M29+ CO2+   TI     VX     VY     VZ   FII BKGI  VPI TOTE    TE  F1E BKGE VPTE    N1
  T1    N2    T2  F1P BKGP VPPE
(I8,I9,I5,I5,I5, F6F7.0,3F4.1,1P2E9.2,0PF6.2,2F7.0,1P2E9.2,0PF6.2,F7.0,F4.2,2F5.1,1P2E9.2,0PF6.2)

                      999999999999999.999999.999999.999999.999999.999999.99.999.999.9 9.99E+0
0 9.99E+00999.99999999.999999. 9.99E+00 9.99E+00 99.99999999.9.99999.9999.9 9.99E+00 9.99E+00999.99
19800110 37457472  501 -1800999999999999999.999999.999999.999999.999999.999999.99.999.999.9 9.99E+0
0 9.99E+00999.99999999.999999. 9.99E+00 9.99E+00 99.99999999.9.99999.9999.9 9.99E+00 9.99E+00999.99
19800110 37469472  501 -1788999999999999999.999999.999999.999999.999999.999999.99.999.999.9 9.99E+0
0 9.99E+00999.99999999.999999. 9.99E+00 9.99E+00 99.99999999.9.99999.9999.9 9.99E+00 9.99E+00999.99
19800110 37481472  501 -1776999999999999999.999999.999999.999999.999999.999999.99.999.999.9 9.99E+0
0 9.99E+00999.99999999.999999. 9.99E+00 9.99E+00 99.99999999.9.99999.9999.9 9.99E+00 9.99E+00999.99
19800110 37493472  501 -1764999999999999999.999999.999999.999999.999999.999999.99.999.999.9 9.99E+0
0 9.99E+00999.99999999.999999. 9.99E+00 9.99E+00 99.99999999.9.99999.9999.9 9.99E+00 9.99E+00999.99
19800110 37505472  501 -1752999999999999999.999999.999999.999999.999999.999999.99.999.999.9 9.99E+0
0 9.99E+00999.99999999.999999. 9.99E+00 9.99E+00 99.99999999.9.99999.9999.9 9.99E+00 9.99E+00999.99
19800110 37517472  501 -1740999999999999999.999999.999999.999999.999999.999999.99.999.999.9 9.99E+0
0 9.99E+00999.99999999.999999. 9.99E+00 9.99E+00 99.99999999.9.99999.9999.9 9.99E+00 9.99E+00999.99
19800110 37529472  501 -1728999999999999999.999999.999999.999999.999999.999999.99.999.999.9 9.99E+0
0 9.99E+00999.99999999.999999. 9.99E+00 9.99E+00 99.99999999.9.99999.9999.9 9.99E+00 9.99E+00999.99
19800110 37541472  501 -1716999999999999999.999999.999999.999999.999999.999999.99.999.999.9 9.99E+0
0 9.99E+00999.99999999.999999. 9.99E+00 9.99E+00 99.99999999.9.99999.9999.9 9.99E+00 9.99E+00999.99
19800110 37553472  501 -1704999999999999999.999999.999999.999999.999999.999999.99.999.999.9 9.99E+0
0 9.99E+00999.99999999.999999. 9.99E+00 9.99E+00 99.99999999.9.99999.9999.9 9.99E+00 9.99E+00999.99
19800110 37565472  501 -1692999999999999999.999999.999999.999999.999999.999999.99.999.999.9 9.99E+0
0 9.99E+00999.99999999.999999. 9.99E+00 9.99E+00 99.99999999.9.99999.9999.9 9.99E+00 9.99E+00999.99
19800110 37577472  501 -1680999999999999999.999999.999999.999999.999999.999999.99.999.999.9 9.99E+0
0 9.99E+00999.99999999.999999. 9.99E+00 9.99E+00 99.99999999.9.99999.9999.9 9.99E+00 9.99E+00999.99
19800110 37589472  501 -1668999999999999999.999999.999999.999999.999999.999999.99.999.999.9 9.99E+0
0 9.99E+00999.99999999.999999. 9.99E+00 9.99E+00 99.99999999.9.99999.9999.9 9.99E+00 9.99E+00999.99
19800110 37601472  501 -1656999999999999999.999999.999999.999999.999999.999999.99.999.999.9 9.99E+0
0 9.99E+00999.99999999.999999. 9.99E+00 9.99E+00 99.99999999.9.99999.9999.9 9.99E+00 9.99E+00999.99
19800110 37613472  501 -1644999999999999999.999999.999999.999999.999999.999999.99.999.999.9 9.99E+0
0 9.99E+00999.99999999.999999. 9.99E+00 9.99E+00 99.99999999.9.99999.9999.9 9.99E+00 9.99E+00999.99
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